

Application No. 10/014,165
Response to Office Action

Customer No. 01933

R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

THE TITLE

The title has been amended to more clearly indicate the nature of the invention to which the claims are directed, as required by the Examiner.

THE SPECIFICATION

The specification has been amended to correct some minor informalities of which the undersigned has become aware. No new matter has been added, and it is respectfully requested that the amendments to the specification be approved and entered.

THE CLAIMS

Claims 1-16 have been amended to make some minor grammatical improvements and to correct some minor antecedent basis problems so as to put them in better form for issuance in a U.S. patent.

In addition, claims 17 and 19 have been added to recite that a life span of each unit is different, as shown in Figs. 6-8, for example, and as supported by the disclosure in the specification at, for example, page 16, lines 13-21.

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Still further, claims 18 and 20 have been added to recite the feature of the present invention whereby one first storage section and one second storage section are provided in each unit, as shown in Fig. 10, for example.

No new matter has been added, and it is respectfully requested that the amendments to claims 1-16 and the addition of claims 17-20 be approved and entered.

It is respectfully submitted, moreover, that the amendments to claims 1-16 are not related to patentability, and do not narrow the scope of the claims either literally or under the doctrine of equivalents.

THE PRIOR ART REJECTION

Claims 1-16 were rejected under 35 USC 103 as being obvious in view of various combinations of US 2002/0057916 ("Yamauchi"), USP 5,839,018 ("Asanuma et al") and USP 5,905,008 ("Yoshinaga et al"), USP 5,812,902 ("Lee"), USP 5,701,551 ("Honda et al"), USP 6,324,357 ("Gomi et al") and US 2001/0028802 ("Otomo et al"). These rejections, however, are respectfully traversed.

According to the present invention as recited in independent claim 1, an image forming apparatus is provided which comprises a plurality of dismountable units necessary for image forming. A first storage section stores an amount of use of each unit, and a

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second storage section stores, for each unit, a respective condition which enables the unit to execute an optimal image forming operation corresponding to the amount of use of the unit. A control section reads, for each unit, the respective condition from the second storage section, which enables the unit to execute the optimal image forming operation, based on the amount of use of the unit stored in the first storage section, thereby operating the unit under the respective read condition.

With this structure, the amount of use of each of the plurality of units is individually stored in the first storage section, and respective conditions for operating the units based on the amount of use thereof are stored in the second storage section. Thus, according to the present invention as recited in independent claim 1, the control section individually controls each of the plurality of units based on the individual amount of use thereof, to execute the optimal image forming operation based on the respective condition stored for the individual unit that corresponds to the amount of use. Therefore, even if one unit is replaced while other units are not, each unit can still be operated optimally based on the amount that the particular unit has been used.

Similarly, independent claim 9 recites the method of the present invention corresponding to the subject matter of claim 1.

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By contrast, according to Yamauchi, a used amount of the photosensitive drum 3 is calculated, and process conditions are optimized based on the used amount and a conversion table. According to Yamauchi, the values controlled based on the use amount of the photosensitive drum include the charging voltage and the developing voltage (paragraph [0100], step S109) of the charging roller 2 and developing roller 4b, respectively. Thus, Yamauchi discloses controlling operating conditions of various units of the process cartridge 1 based on the use amount of the photosensitive drum 3.

It is respectfully submitted, therefore that Yamauchi does not disclose, teach or suggest changing a condition for operating each of a plurality of units based on an individual use amount of that particular unit, in the manner of the claimed present invention. Rather, Yamauchi discloses controlling a plurality of units based on a single use amount value of a particular unit.

It is respectfully submitted, moreover, that Asanuma et al and Yoshinaga et al also do not disclose, teach or suggest this feature of the claimed present invention. Indeed, Yoshinaga et al has merely been cited for the disclosure of dismountable units (i.e. first and second "apparatus units" in Fig. 3 thereof), and Asanuma et al has been cited for the disclosure of controlling a developer based on the use amount thereof, but does not disclose, teach or suggest controlling a plurality of units based on

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respective conditions corresponding to individual use amounts thereof.

Accordingly, it is respectfully submitted that even if the teachings of Yamauchi, Yoshinaga et al and Asanuma et al were combinable in the manner suggested by the Examiner, such combination would still not achieve or render obvious the above described structural features and advantageous effects of the present invention as recited in independent claims 1 and 9.

In addition, it is respectfully pointed out that according to the present invention as recited in claim 2 and corresponding method claim 10, a detection section detects whether or not each one of the units is new or old, and when the detection section has detected that any one of the units is new, the control section resets the amount of use of the one unit stored in the first storage section and then reads the condition which enables the one unit to execute the optimal image forming operation. Thus, each of the plurality of units may be individually replaced and its use amount reset, while the use amounts of the other units remain the same. With this structure, a unit can be replaced while the older units can still function according to the respective use amounts thereof.

As pointed out by the Examiner, Lee discloses resetting a "sheet printing index value" when a process cartridge is exchanged. However, as explained hereinabove, the combination of

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Yamauchi, Asanuma et al and Yoshinaga et al merely discloses controlling a plurality of units based on a single use amount value. Therefore, it is respectfully submitted that even if Lee were combinable with Yamauchi, the logical result would be resetting the use amount of the photosensitive drum 3 (based upon which control is performed), when the process cartridge 1 of Yamauchi is replaced. And it is respectfully pointed out that this logical result entails resetting the one use amount value used to control a plurality of units, and therefore even the combination of Yamauchi, Asanuma et al, Yoshinaga et al and Lee does not achieve or render obvious the features of the present invention as recited in claims 2 and 10 whereby when the detection section has detected that any one of the units is new, the control section resets the amount of use of the one unit stored in the first storage section and then reads the condition which enables the one unit to execute the optimal image forming operation.

Still further, it is respectfully pointed out that according to the present invention as recited in new claims 17 and 19, the life span of each unit is different. With this structure, the present invention is particularly advantageous in that even if a unit having a short life span is exchanged, the units still in use that have longer life spans may still be individually controlled based on the respective use amounts thereof, as

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explained hereinabove. Thus, it is possible to replace only parts having a short life span, while allowing more durable parts to remain in use. The present invention thereby has a cost-saving effect on the use of consumable units. See page 17, line 24 to page 18, line 4.

Yet still further, it is respectfully pointed out that according to the present invention as recited in new claims 18 and 20, one first storage section and one second storage section are provided in each unit. As described in the specification at page 19, line 24, to page 20, line 1 of the specification, it is thereby possible to operate each unit in an optimum state even if the unit is installed in another image forming apparatus, because the first and second storage seconds are provided to the unit itself.

In view of the foregoing, it is respectfully submitted that the present invention as recited in independent claims 1 and 9, as well as each of claims 2-8 and 10-20 respectively depending therefrom, clearly patentably distinguishes over all of the cited references, taken in any combination under 35 USC 103.

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Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

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If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned for prompt action.

Respectfully submitted,



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